

FRBSF WEEKLY LETTER

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The Silicon Valley Economy

When most people think about Silicon Valley they think of computers and computer components—and the economic boom that those technological innovations brought to the region. Although technology continues to dominate the area, in recent years the economic boom has turned to a whimper. This *Weekly Letter* describes the earlier growth of the Silicon Valley economy and documents the onset of the current weakness. The analysis suggests that there is some reason for optimism about the area's future, although several factors are likely to restrain growth in the short term.

A high-tech region

Technology-oriented industries clearly are important to Santa Clara County, which includes the Silicon Valley. At the end of 1991, the electronics and computer sectors alone accounted for 17 percent of Santa Clara County's jobs, compared to less than 2 percent for the U.S. Given the importance of these technology industries to the area's economy, it should not be surprising that these industries are major determinants of overall economic activity in the Silicon Valley. Simple statistical tests suggest that these two industries, taken together, explain about 60 percent of employment fluctuations in Santa Clara County between 1972 and 1991.

The 1970s boom

From 1970 to 1980, the number of jobs in Santa Clara County increased from 380,000 to 665,000. This phenomenal rate of job creation was almost three times the national pace during the same period.

A large proportion of these new jobs were in the computer and electronic components sectors, which alone added more than 84,000 jobs just between 1972 and 1980. That means that computers and electronic components accounted for close to a third of the decade's employment growth—a huge contribution considering that these sectors accounted for only 12½ percent of the region's jobs in 1972.

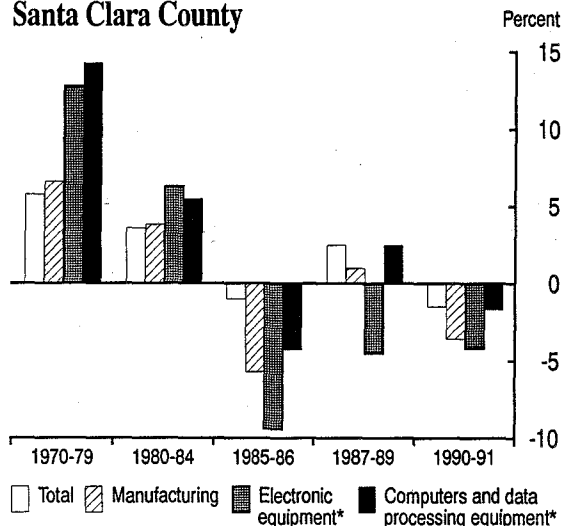
Because of the rapid growth in computer and electronics jobs, manufacturing employment al-

most doubled during the decade, adding 115,000 jobs in Santa Clara County. Fully 40 percent of the region's new jobs were in the manufacturing sectors. By way of comparison, only 5 percent of the jobs created nationally during the 1970s were in manufacturing industries. As a result of the spurt in the area's manufacturing jobs, by 1980, Santa Clara County was much more dependent on manufacturing jobs than the U.S. was. Manufacturing accounted for 37 percent of its jobs, compared with only 22 percent of national jobs.

The early to mid-1980s: Growth and a downturn

In the first half of the 1980s, the pace of overall job creation slowed somewhat, to a 3.6 percent annual rate from the frenetic 5.8 percent pace of the 1970s (see Chart). Still this performance was relatively strong, considering that the nation suffered two recessions during the 1980–1982 period.

Change in Employment, Annual Rate Santa Clara County



The pattern of growth was like the 1970s, with technology-related industries accounting for more than their share of the country's new jobs. Employment in electronic equipment grew at an annual rate of 6.3 percent, while the number of computer jobs grew at a 5.5 percent annual rate.

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In the mid-1980s, while the nation was experiencing a rapid recovery, Silicon Valley had a recession. Santa Clara County lost 28,000 jobs from the beginning of 1985 until the end of 1986: 20,000 in the electronic equipment industry alone, and 6,000 in the computer sector. The remaining three-fourths of the region's economy—including other manufacturing sectors, as well as services, trade, and construction—came out just about even during this two-year period.

It is not hard to find explanations for the downturn. First, the initial surge in demand for personal computers had been satisfied. Additional sales had to wait until buyers had digested their recent purchases, or until further technological developments made those purchases obsolete, or until prices fell far enough to bring additional buyers into the market. Second, the electronic components sector faced an excessive buildup of memory chip inventories, and production suffered while those inventories were drawn down. Finally, competition from foreign producers was cutting into an industry that previously had been dominated by U.S. companies.

The late 1980s: Modest improvement

The region's economy did pick up during the final years of the decade, but the bloom clearly was off the rose. From the beginning of 1987 until the end of 1989, employment in Silicon Valley grew at a healthy but unspectacular annual rate of 2½ percent. However, electronic equipment employment in Silicon Valley continued to decline, falling at a rapid rate averaging 4½ percent annually. As a result, at the beginning of 1990, employment in Silicon Valley's electronic equipment sector was even lower than the level at the beginning of the 1980s.

This made the area's economy look more like that of other regions, with services and other non-manufacturing sectors taking over as the leading sources of job creation. Indeed, in a reversal from the area's previous experience, manufacturing grew much more *slowly* than the rest of the area's economy.

The early 1990s: Another downturn

So far in the 1990s, conditions have continued to be disappointing. Since employment reached its

most recent peak in May of 1990, Santa Clara County has lost 33,700 jobs. This makes the current downturn as long as the mid-1980s downturn, but more severe in terms of the number of jobs lost. The number of jobs in March 1992 was about the same as in November 1991, suggesting that the economy may have stopped deteriorating.

As in the mid-1980s, manufacturing industries dominate the decline, accounting for 15,200 of the 33,700 jobs lost. The electronic components sector alone lost 7,300 jobs. But, unlike the mid-1980s, weakness in Silicon Valley this time around has coincided with weak economic conditions in both California and the nation, so the job losses now are spread throughout the economy. Whereas computers and electronic equipment together accounted for 97 percent of the area's net job losses in 1985–86, these sectors have contributed only a fifth of the net lost jobs this time around. (In fact, Santa Clara County computer makers actually added 600 jobs to their payrolls during the past two years.) Reflecting the more generalized weakness, 8,800 jobs have been lost in trade sectors, while the service sector has lost 3,500 jobs. On top of this weakness, Santa Clara County has been hard hit by defense cuts, leading to the loss of 3,700 jobs in the guided missiles and space vehicles sector.

The current situation

All told, then, the Santa Clara County economy has been fairly weak for the past seven years. There are several explanations for this weakness, with sluggishness in the area's crucial high-tech industries prominent among them.

To some extent, slower growth in computers and electronic components would be expected as the markets for new products grow and mature. In addition, many have argued that the industry's activity—particularly large-scale production activity—has moved from Silicon Valley to other, lower-cost locations. The U.S. clearly has lost market share as production by foreign companies has increased. According to the Semiconductor Industry Association, the share of U.S.-based companies in total world semiconductor production fell fairly steadily at least until 1988 (65 percent in 1977, 60 percent in 1982, 45 percent

in 1987, and 38 percent in 1988). Moreover, the share of industry production actually made in the U.S. has fallen even more sharply, since U.S. investments in facilities abroad were growing during this period.

There is evidence, though, that 1988 marked the nadir for U.S. semiconductor firms, and that they have halted their slide—or perhaps even improved their position—since then. The U.S. share of the world semiconductor market now stands at just under 40 percent, a small increase from 38 percent in 1988. The improved position of U.S. producers is attributable to several factors, including better chip quality and U.S. firms' willingness to plow money into innovative but untested technologies. Japanese firms continue to excel in manufacturing, and in fact are involved in several joint ventures to manufacture technology products developed and licensed by U.S. firms.

Problems among high-tech producers have not been the only sources of weakness in the Silicon Valley in recent years. Defense cutbacks have hurt, and a national recession that has hit California particularly hard has provided an additional negative blow.

In this context, recent improvements in the national economy provide some positive news, as increased profits and production should give firms the resources to invest in additional computer capacity. And indications that American high-tech producers have found profitable niches in the international market also represent a positive development.

At the same time, though, defense cutbacks are likely to continue for a few more years, and the market for computer-related technologies remains very competitive. These factors are likely to keep any immediate recovery relatively restrained. Nevertheless, the prospects for the medium to long term are reasonably bright. The concentration of highly educated workers, combined with the infrastructure of financial, business, and legal services that are unusually well-suited to fostering new technologies, enable the area to continue to be an important seedbed of innovations in technology-oriented industries.

Carolyn Sherwood-Call
Economist

Research Department
Federal Reserve
Bank of
San Francisco

P.O. Box 7702
San Francisco, CA 94120

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The *FRBSF Weekly Letter* appears on an abbreviated schedule in June, July, August, and December.